



# Use of Data Analytics to Improve Continuum of Care

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# Current Trends in Healthcare

- From 2017-2022, healthcare spending will increase at 5.4% from \$7.724 trillion to \$10.059 trillion globally.
- 765 Million individuals over 65 years by 2025
- In USA, 50% of the population will be living with chronic illness in 2020 and healthcare cost will jump to \$4.5 trillion
- Shift from fee-for-service to value based care delivery
- Healthcare data is growing at CAGR( Cumulative Average Growth Rate) of 36% through 2025

## WHAT IS HEALTH?

**"State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." Health is a destination that we reach to help us become productive in life."**

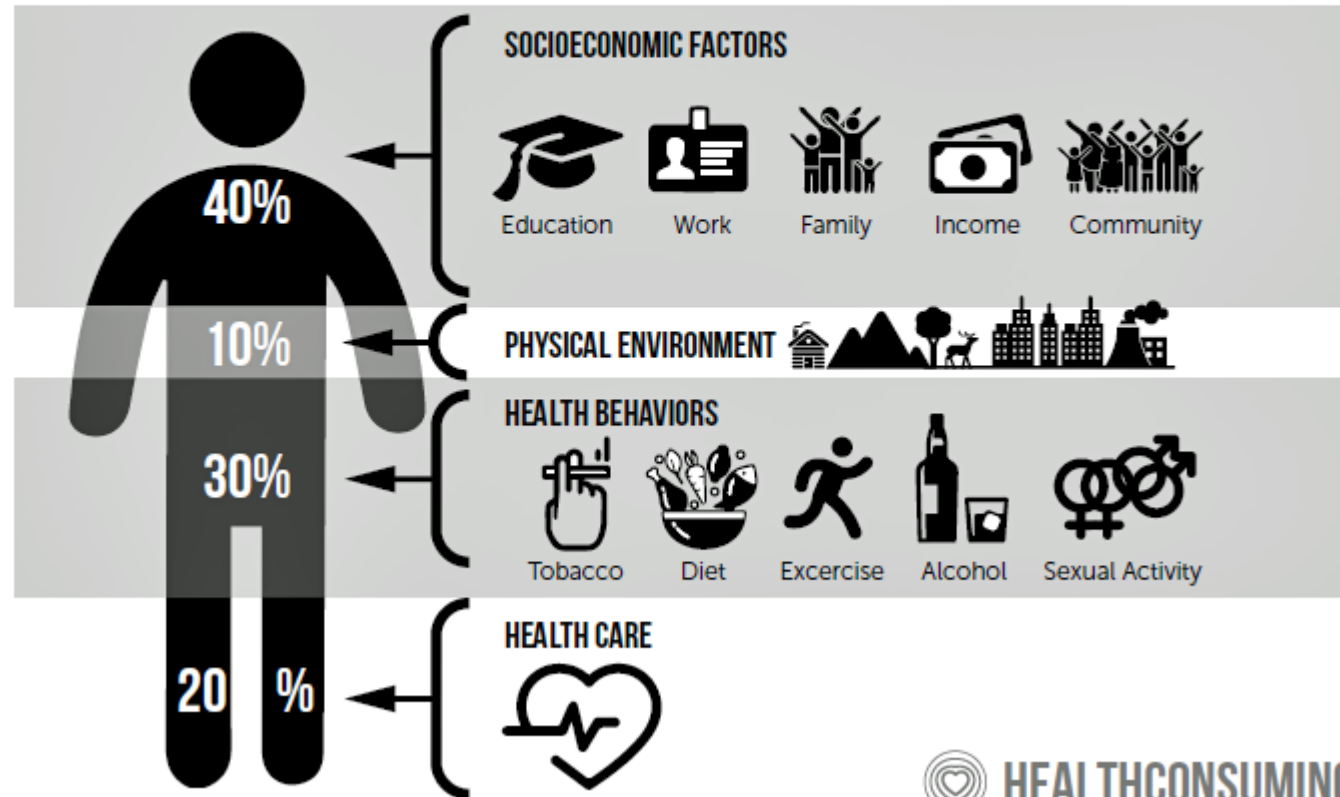
World Health Organization (WHO)

# What Influences Our Health?

ZIP CODES, GENETIC CODES, FOOD AND HEALTH 145

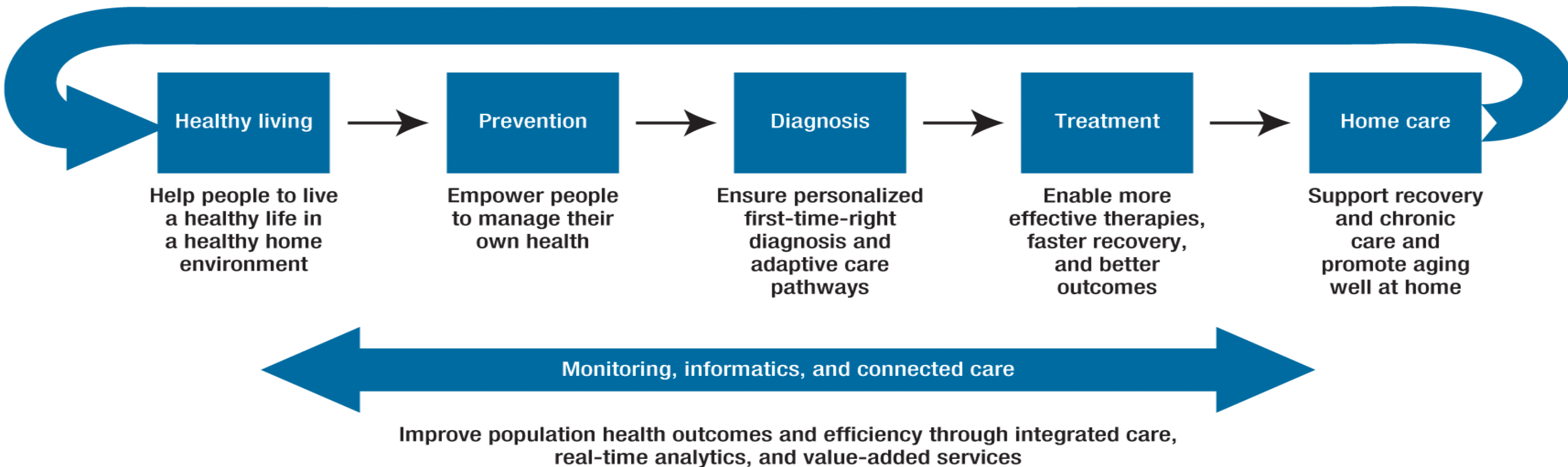
## THE SOCIAL DETERMINANTS OF HEALTH: HEALTH MADE BY MANY FACTORS BEYOND HEALTH CARE

Source: Schroeder SA.  
We Can Do Better -  
Improving the Health of  
the American People.  
NEJM 357:1221-8, 2007

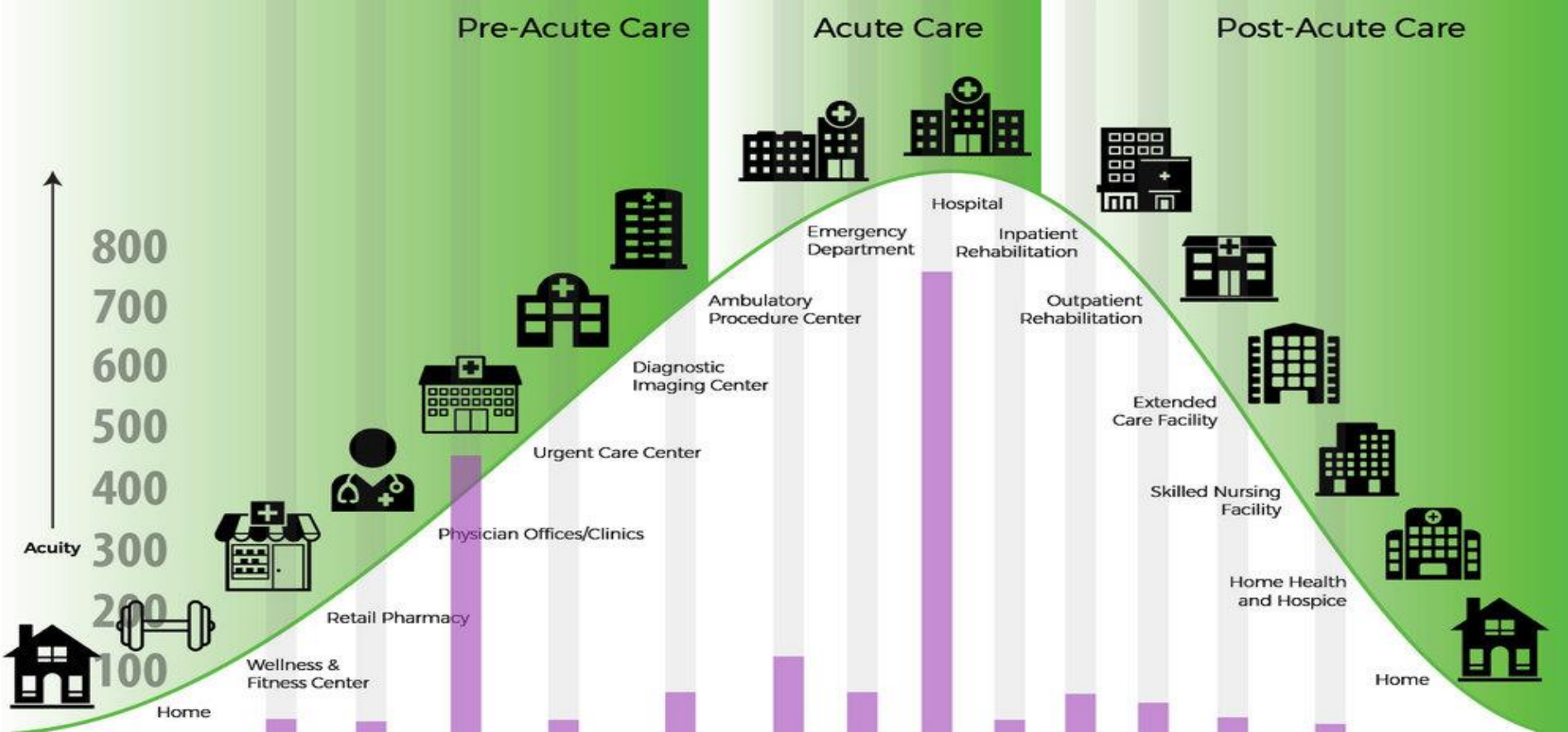


# What is Continuum of Care

- Continuum of Care is a concept involving a system that guides and tracks patients over time through a comprehensive array of health services spanning all levels and intensity of care

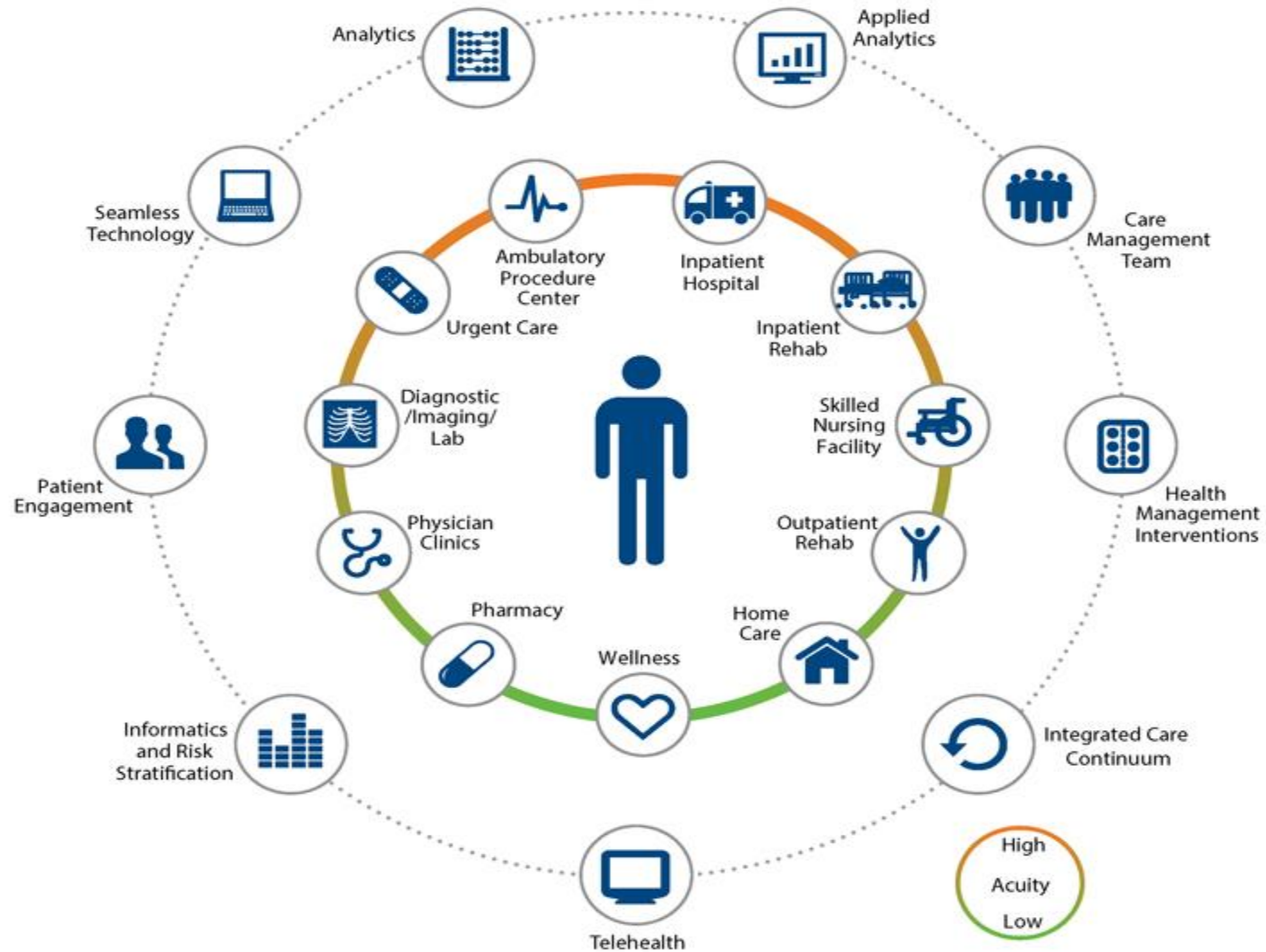


# Healthcare Continuum



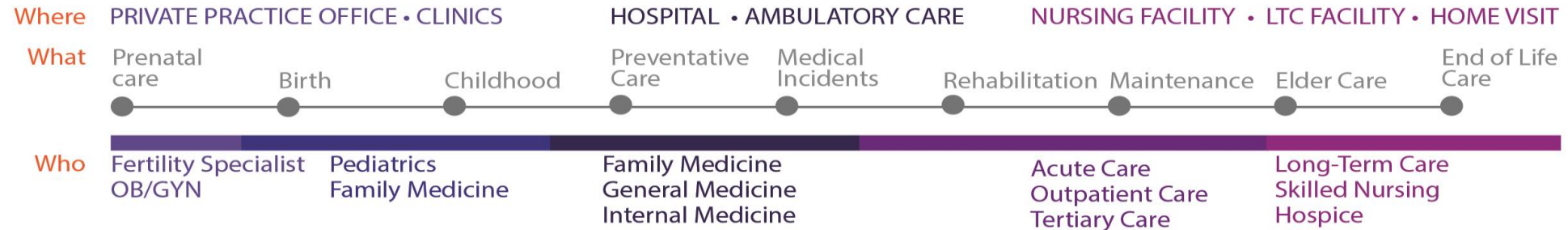


# Continuum of Care – Services & Mechanism



# Characteristics & Conditions

## Continuum of Care



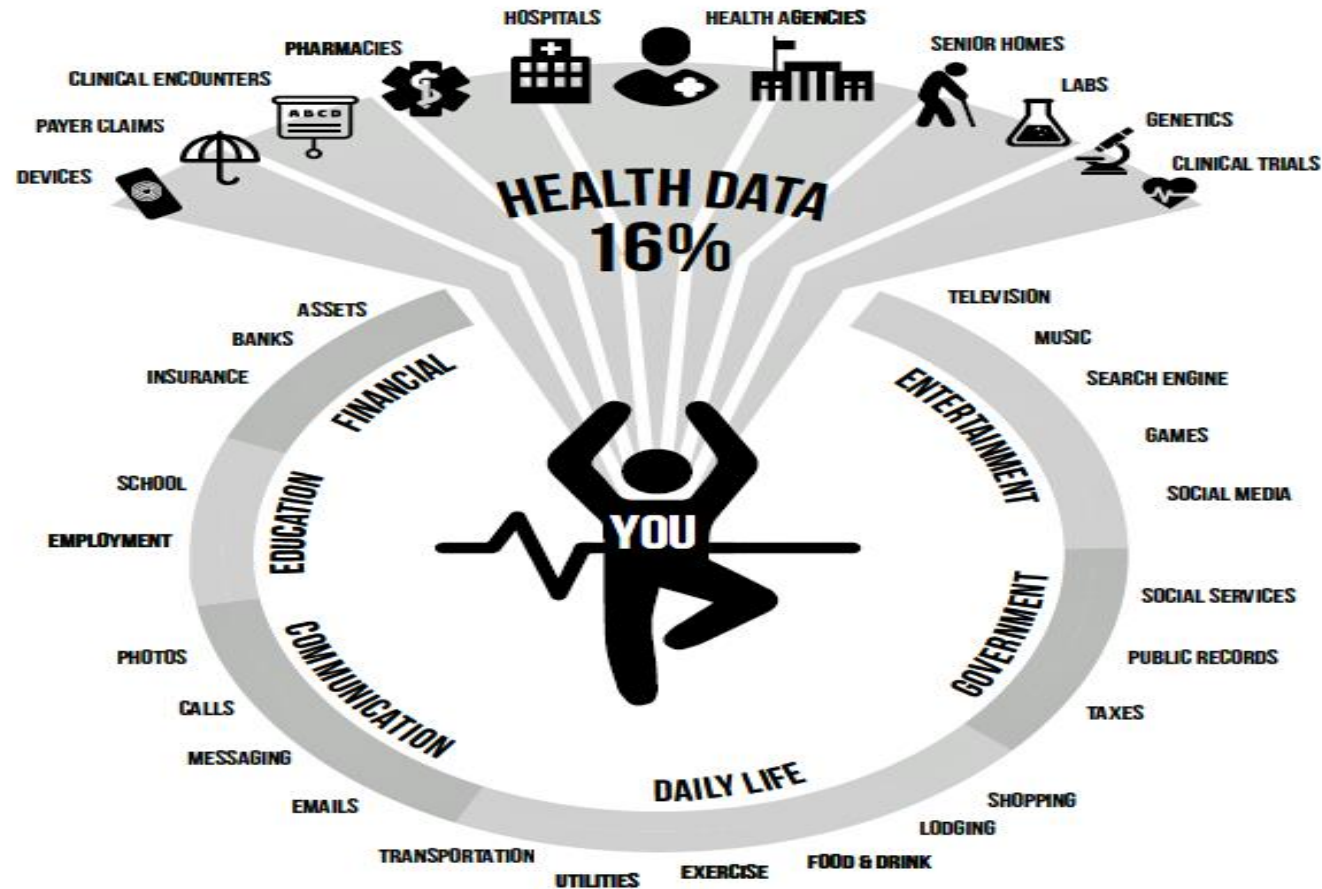
- Prenatal Care
- Genetic birth defects causing pre-/post-natal morbidity/mortality
- Genetic anomalies that increase physical or behavioral illness
- Newborn care
- Healthy patient/Preventive care
- Healthy lifestyle counseling
- Unhealthy lifestyle/high risk factor care
- Acute illness
- Acute injury
- Chronic illness or morbid conditions
- Recovery from physical illness
- Recovery from mental illness or addiction
- Rehabilitation for physical injury
- Imminent death
- Deceased-care for the emotional, financial and societal needs of the family, as well as public health and research.



# What is HealthCare Data?

134 HEALTHCONSUMING • JANE SARASOHN-KAHN

## SOURCES OF YOUR DATA



Source: Adapted from Sources of Your Data, Golnvo and Juhan Sonin, February 2019

# Usage of Analytics in Healthcare

## Big Data in Healthcare



### Predictive

What negative health trends are likely to develop in our communities?

### Proactive

Who is at risk?  
Who needs to be informed?

### Personalized

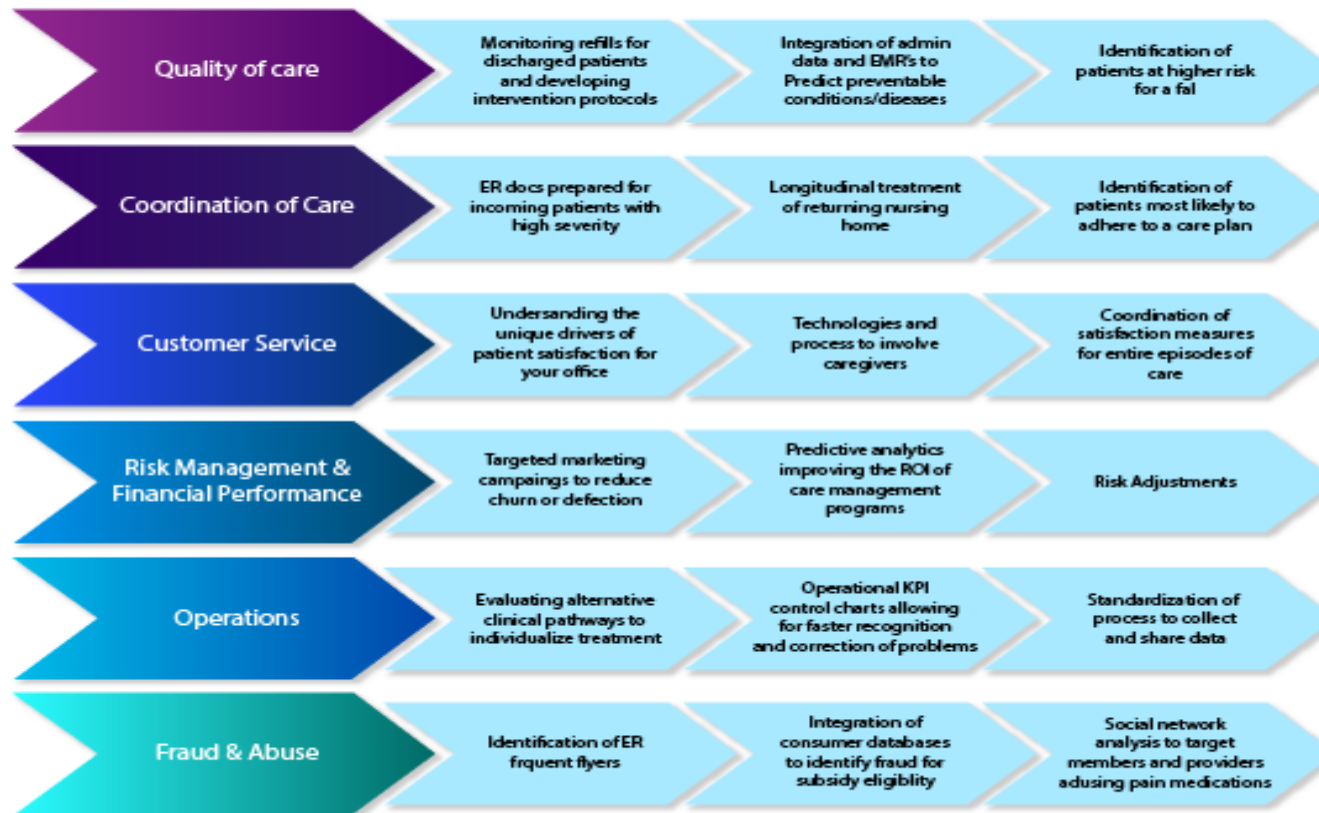
What is the best combination of services for this individual?

### Preventive

What actions can we take now to prevent a negative episode?

# Analytics in Action

## Healthcare Examples



# Analytics Across Continuum



Wellness Trackers

Risk Stratification

Disease identification

Case based intervention

Genomic Analytics

Transitions in care

Home care/Monitoring

Public Health Analytics

# 1. Wellness monitoring at Home

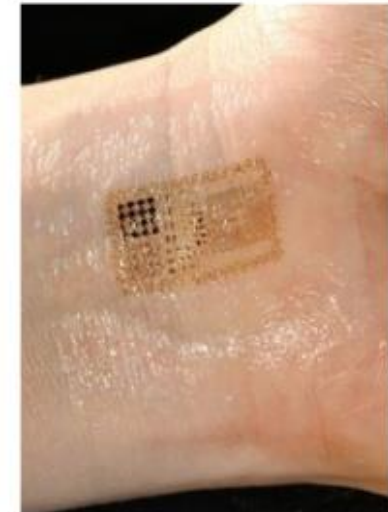
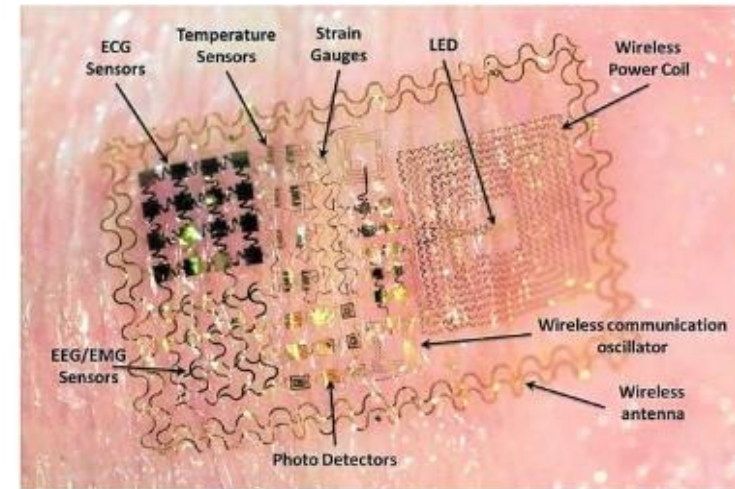
## Home Monitoring & Personal Health Dashboards



## Next Generation Medical Sensor Technology



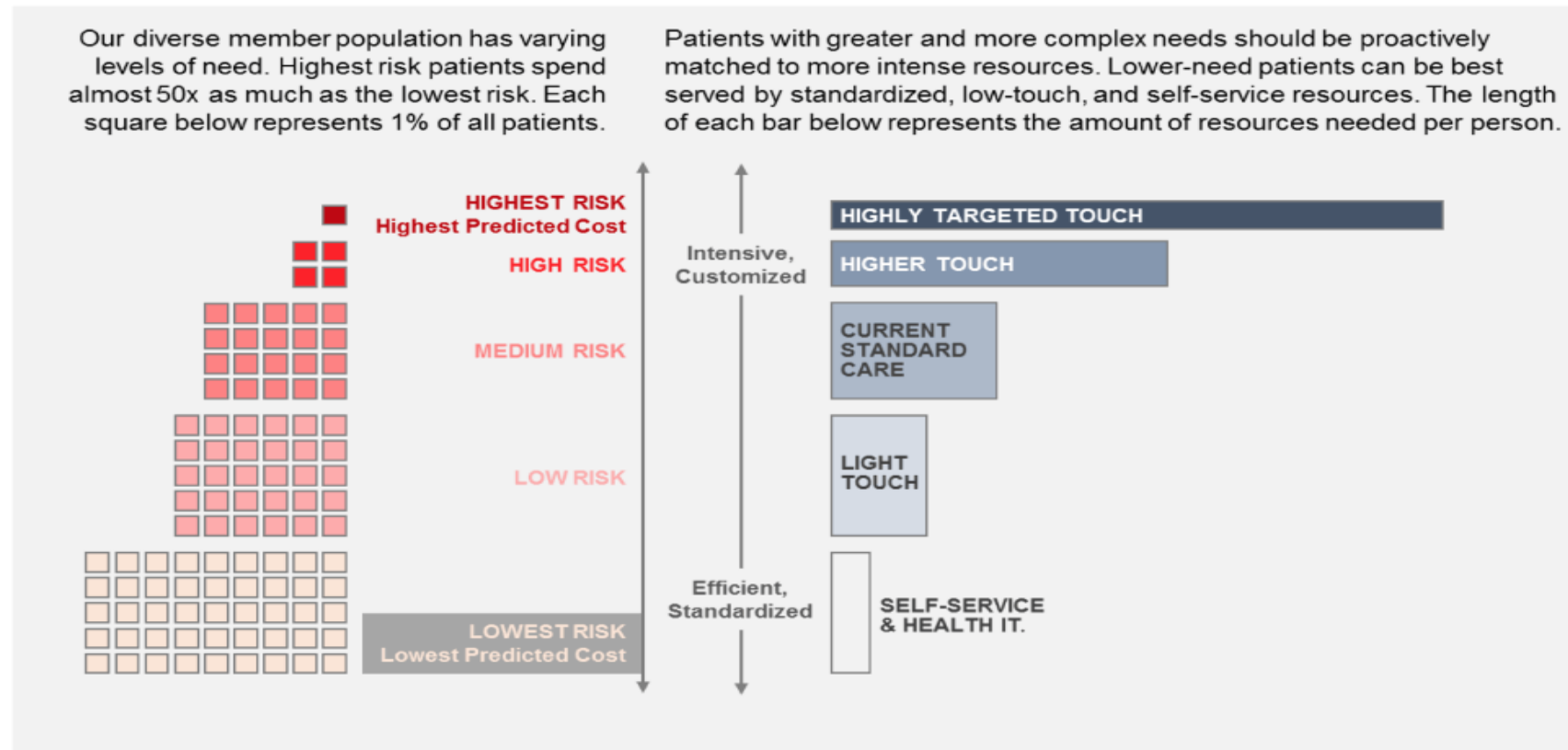
### Electronic Sensors Printed on Skin "Skintronics"





# 2. Disease identification and risk stratification

## Care Across the Continuum: A Scaled Approach Matching Resource Intensity To Patient Need

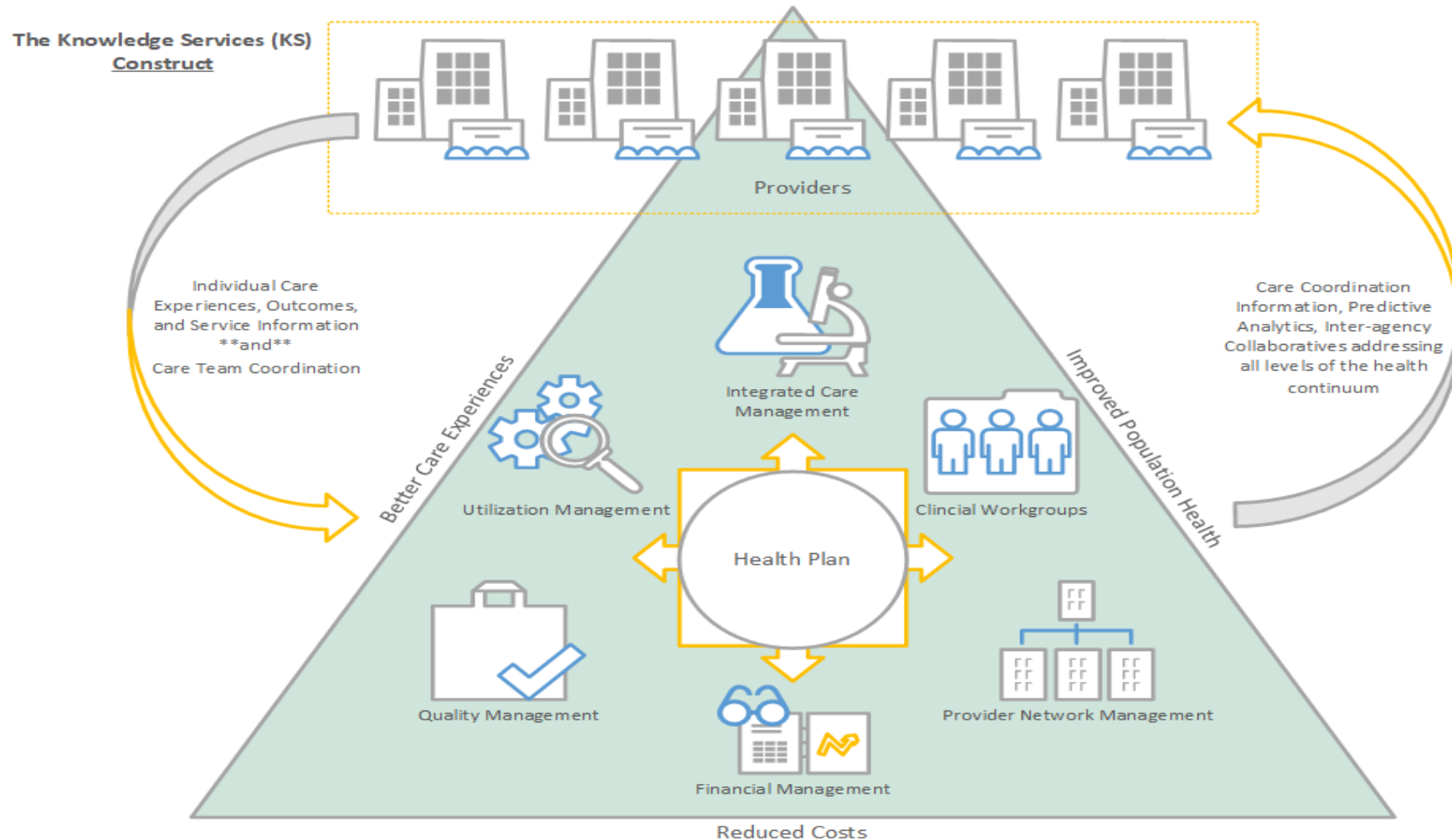


Graphic by Dana Barnes, MPH.

NEJM Catalyst ([catalyst.nejm.org](http://catalyst.nejm.org)) © Massachusetts Medical Society



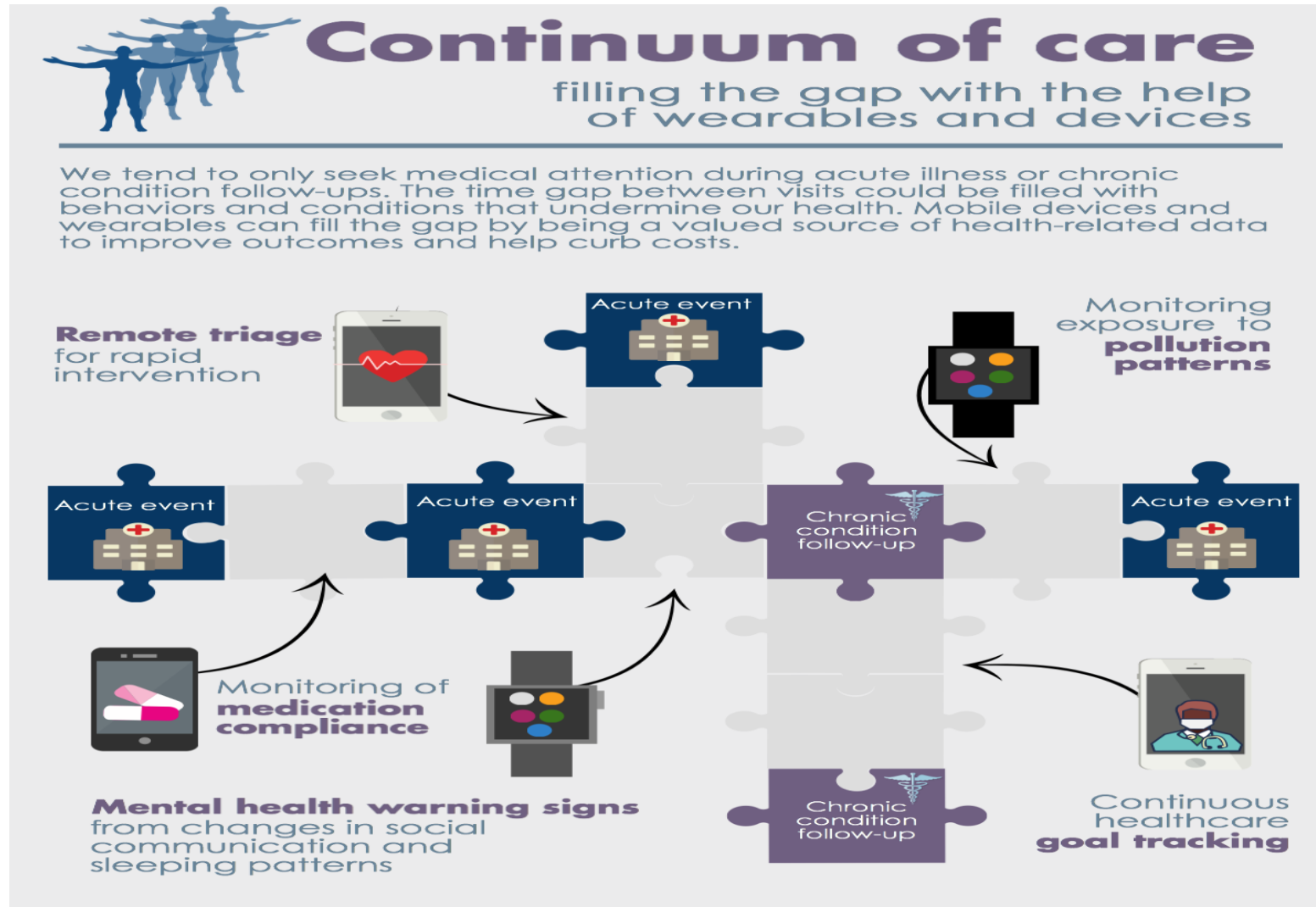
# 3. Care Coordination by healthcare provider



## **TRIPLE AIM ACTUALIZED**

This diagram represents the interrelationship between workgroups within health plans, and/or in cooperative arrangements between providers and health plans. KS depends on these relationships to help organizations achieve Triple Aim objectives.

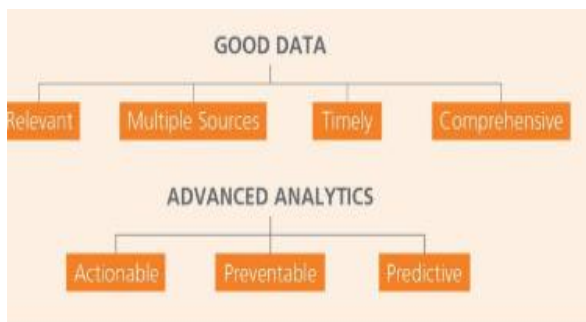
# 4. Fill the Care gap using device monitoring



# Intervention Points in Care Continuum

## Find the Right Patients

- Create a registry of patients using advanced analytics on good data



## Stratify a Patient's Risk Factors

Apply analytics to patient's longitudinal health history to determine risk factors or barriers.

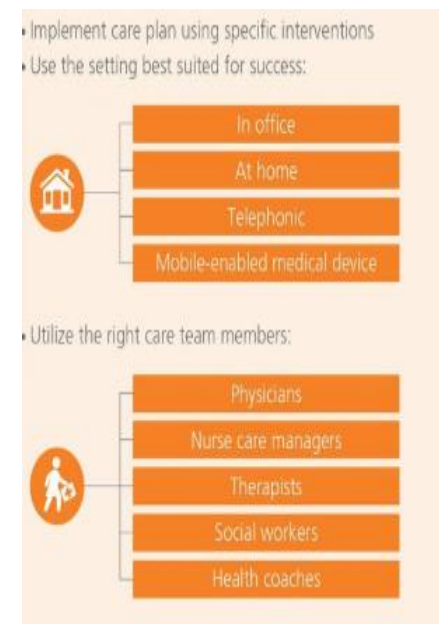


## Prioritize Opportunities for Intervention

Identify the most significant risk factor and also, who can benefit most from intervention

## Develop a Care Plan

Develop a care plan working with patient and care teams to address clinic needs as well as high priority barriers to care



## Intervene

## Evaluate

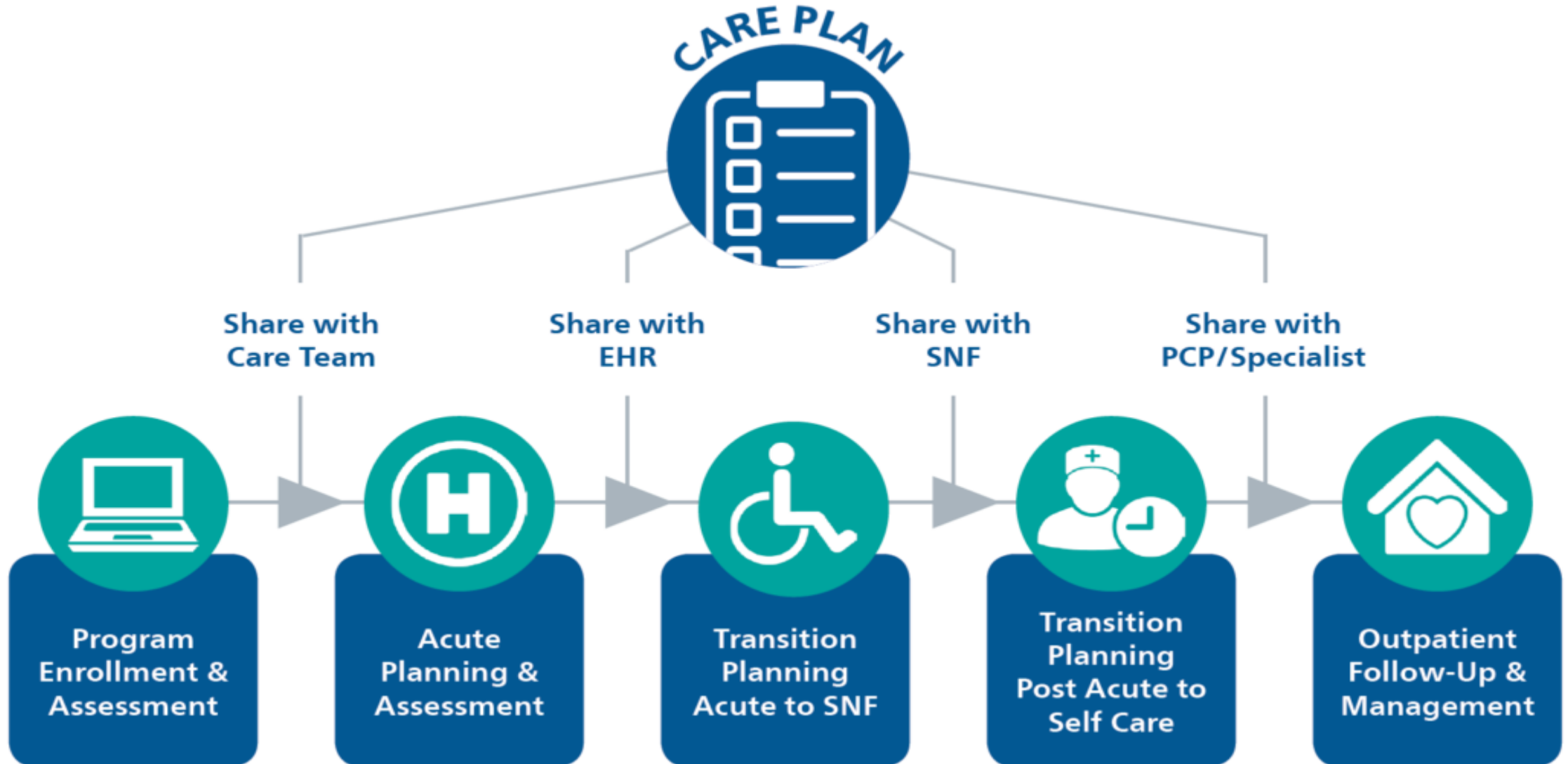
Determine effectiveness of intervention

Set baseline

Compare post intervention status

Assess Success

# Care Coordination in Action



# What are the roadblocks to achieve care continuum using data?

- Poor data quality
- Lack of interoperability
- Lacks of system level integration of information architecture
- Varied data definitions
- Lack of comprehensive data governance
- Lack of data security
- Lack of transparency
- Lack of policy & regulations at the legislative environment to encourage innovation & research

# Future State

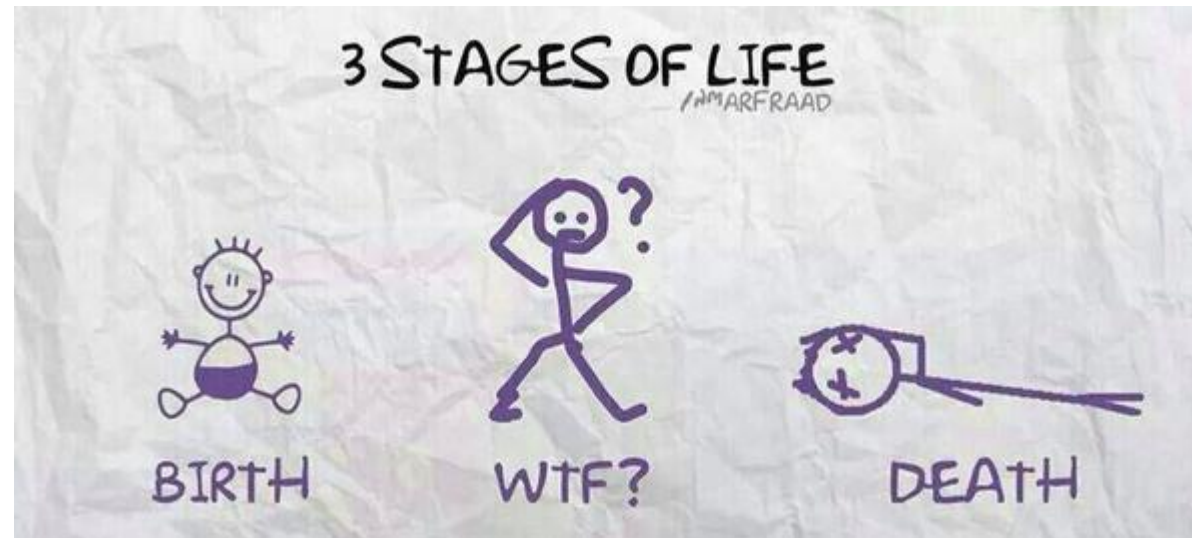
- The goal of healthcare systems and providers is :
  - Promote well being
  - Prevent Sickness
  - Provide High Quality, Safe & Convenient services.

To do this healthcare organizations must adopt a CRM( Customer Relationship Management) mindset , each touchpoint in the patient journey is an opportunity to collect more metrics and characteristics about that person, and use analytics to extract INSIGHT that can help provide more value to patient across care continuum inside & outside the healthcare system



Questions?

What is common between all these stages?



DATA

# Add On-USE CASES OF ANALYTICS IN HEALTHCARE

- Predict the daily incoming patients to plan capacity, staffing & resources accordingly.
- Use real-time alerting for instant care
- Help in preventing opioid abuse in the US
- Enhance patient engagement in their own health
- Use health data for a better-informed strategic planning
- Research more extensively to cure cancer & Alzheimer's etc.
- Use predictive analytics for risk stratification and preventive care
- Reduce fraud and enhance data security
- Practice telemedicine
- Integrate medical imaging for an broader diagnosis
- Prevent unnecessary ER visits